UNOFFICIAL TRANSLATION

THAI AGRICULTURAL STANDARD

TAS 9503 – 2005

COMPOST

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives
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Compost is a type of organic fertilizer which are basically made from plant and animal materials and widely known namely compost, manure, green manure, bio-fertilizer and bio-organic fertilizer. Organic fertilizer is an important agricultural input for Thai agriculture in order to improve the quality of poor soil and to continuously maintain soil fertility. The National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperatives has set a standard for compost in order to ensure that compost produced in Thailand meet the standard and safe for all concerned parties throughout the food chain.

The establishment of this standard is based on the information of the following documents:


Remark:
The standard title has been revised from “Thai Agricultural Commodity and Food Standard (TACFS)” to “Thai Agricultural Standard (TAS)” in accordance with the enforcement of the Agricultural Standards Act B.E. 2551 (2008)
NOTIFICATION OF THE NATIONAL COMMITTEE ON AGRICULTURAL COMMODITY AND FOOD STANDARDS
SUBJECT: THAI AGRICULTURAL COMMODITY AND FOOD STANDARD: COMPOST
B.E. 2548 (2005)

The resolution of the 2/2548 session of the National Committee on Agricultural Commodity and Food Standards dated 29 August B.E.2548 (2005) endorsed the Thai Agriculture Commodity and Food Standard entitled Compost. This standard would be of benefits for quality improvement, facilitating trade and protecting consumers.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 19 November B.E. 2548 (2005), the Notification on Thai Agricultural Commodity and Food Standard entitled Compost is hereby issued as voluntary standard, the details of which are attached herewith.

Notified on the 5 October B.E. 2548 (2005)

Khunying Sudarat Keyuraphan
Minister of Agriculture and Cooperatives
Chairperson of the National Committee on Agricultural Commodity and Food Standards
THAI AGRICULTURAL STANDARD

COMPOST

1 SCOPE

This standard defines required specifications, containers, labels, marks and sampling method as well as the criteria for compliance.

2 DEFINITIONS

For the purpose of this standard:

2.1 Compost means a type of solid organic fertilizer which is derived or made from organic materials. The materials have undergone a complete decomposition until they transform completely from the original state. The compost provides essential nutrients for plant growth.

2.2 Organic Fertilizer means a type of fertilizer derived or made from organic materials through various processes: moisturising, cutting, crushing, composting, extracting, sieving or others but neither chemical nor bio-fertilizer.

2.3 Organic Materials means those that have organic carbon as a main component such as plant parts, animal parts or droppings.

2.4 Complete Decomposition means a state where organic materials are completely decayed and can be used as compost without causing damage to plants.

2.5 Essential Nutrients means plant nutrients which include:
- Primary nutrients, i.e. total nitrogen (N), total phosphorus (as P$_2$O$_5$) and total potassium (as K$_2$O)
- Secondary nutrients, i.e. Calcium (Ca), Magnesium (Mg) and Sulphur (S)
- Supplementary nutrients, i.e. Ferrous (Fe), Manganese (Mn), Copper (Cu), Zinc (Zn), Boron (B), Molybdenum (Mo) and Chlorine (Cl).
3 SPECIFICATIONS

Compost specifications are according to Table 1:

### Table 1 Compost Specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Criteria</th>
<th>Analysis and Testing Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fertilizer particles</td>
<td>≤ 12.5 x 12.5 mm</td>
<td>CATM 01 or equivalent</td>
</tr>
<tr>
<td>2.</td>
<td>Moisture and evaporable substance</td>
<td>≤ 35 %</td>
<td>AOAC 950.01 or equivalent</td>
</tr>
<tr>
<td>3.</td>
<td>Rocks and gravels</td>
<td>≤ 2 % by weight</td>
<td>CATM 01 or equivalent</td>
</tr>
<tr>
<td>4.</td>
<td>Plastic, glass, sharp particles and other metal parts</td>
<td>≤ 0.01 % by weight</td>
<td>CATM 01 or equivalent</td>
</tr>
<tr>
<td>5.</td>
<td>Organic Matters (OM)</td>
<td>≥ 35 % by weight</td>
<td>AOAC 967.05 or equivalent</td>
</tr>
<tr>
<td>6.</td>
<td>pH</td>
<td>5.5 – 8.5</td>
<td>AOAC 973.04 or equivalent</td>
</tr>
<tr>
<td>7.</td>
<td>Carbon : Nitrogen ratio</td>
<td>≤ 20 : 1</td>
<td>BS 7755 – 3.8 or equivalent</td>
</tr>
<tr>
<td>8.</td>
<td>Electrical Conductivity</td>
<td>≤ 3.5 dS / m</td>
<td>BS EN 13038 or equivalent</td>
</tr>
<tr>
<td>9.</td>
<td>Primary nutrients:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- total nitrogen (N)</td>
<td>≥ 1.0 % by weight</td>
<td>AOAC 955.04 or equivalent</td>
</tr>
<tr>
<td></td>
<td>- total phosphorus (as P₂O₅)</td>
<td>≥ 0.5 % by weight</td>
<td>AOAC 958.01 or equivalent</td>
</tr>
<tr>
<td></td>
<td>- total potassium (as K₂O)</td>
<td>≥ 0.5 % by weight</td>
<td>AOAC 983.02 or equivalent</td>
</tr>
<tr>
<td>10.</td>
<td>Complete decomposition</td>
<td>≥ 80 %</td>
<td>Seed germination index (see Annex A)</td>
</tr>
<tr>
<td>11.</td>
<td>Toxic substances and heavy metals</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Arsenic</td>
<td>≤ 50 mg / kg</td>
<td>EPA Method 7061 A (1998) or equivalent</td>
</tr>
<tr>
<td></td>
<td>- Cadmium</td>
<td>≤ 5 mg / kg</td>
<td>EPA Method 3050 B (1996) or equivalent</td>
</tr>
<tr>
<td></td>
<td>- Chromium</td>
<td>≤ 300 mg / kg</td>
<td>EPA Method 3050 B (1996) or equivalent</td>
</tr>
<tr>
<td></td>
<td>- Copper</td>
<td>≤ 500 mg / kg</td>
<td>EPA Method 3050 B (1996) or equivalent</td>
</tr>
<tr>
<td></td>
<td>- Lead</td>
<td>≤ 500 mg / kg</td>
<td>EPA Method 3050 B (1996) or equivalent</td>
</tr>
<tr>
<td></td>
<td>- Mercury</td>
<td>≤ 2 mg / kg</td>
<td>EPA Method 7471 B (1992) or equivalent</td>
</tr>
</tbody>
</table>

**Remark**: The weight yet to reach 100% is that of the fillers.
4 PACKAGING

Containers for compost shall be moisture-proof and durable for transportation.

5 MARKING AND LABELING

All units of the compost containers shall be labelled legibly which at least provide numbers, letters, marks, and actual details of the content:

(1) The word ‘Compost’.
(2) Trade name and trade mark.
(3) List of organic materials used.
(4) Net weight (kg).
(5) Production date (d/m/y).
(6) Name of product
(7) Location where the compost was produced.
(8) Actual quantity of organic matters, but shall not be less than 35%.

6 SAMPLING

6.1 Terms
   - Lot means the compost that is produced from the same type of organic materials, at the same time, by the same producer at the same location, or made, delivered or sale during the same period.
   - Lot size means the number of containers used for compost produced at each lot.
   - Sample size means the number of samples drawn from each lot of compost to be analyzed.

6.2 Sample shall be drawn from containers of each compost lot to best represent the product. Table 2 presents a sampling plan, which may be used against other similar available plans.

<table>
<thead>
<tr>
<th>Lot Size (number of containers)</th>
<th>Sample Size (number of containers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 21 to 60</td>
<td>2</td>
</tr>
<tr>
<td>61 to 200</td>
<td>3</td>
</tr>
<tr>
<td>201 to 500</td>
<td>8</td>
</tr>
<tr>
<td>501 to 1,000</td>
<td>15</td>
</tr>
<tr>
<td>1,001 to 10,000</td>
<td>20 (but not more than 30)</td>
</tr>
</tbody>
</table>

6.3 Samples drawn from Table 2 above are mixed thoroughly on a clean floor before pooling into a cone shape. After that, flap down the tip of the cone and divide the compost samples into 4 parts. Re-mix the two parts on the opposite to make another cone. Follow the same process by flapping the tip of the cone down and divide it into 4 parts. Repeat the process until the mixture reaches 3 kgs for laboratory analysis.

6.4 Each sample shall follow the specifications outlined in 3, 4, and 5 above in order to be certified.
ANNEX A

Germination Index

A complete decomposition of compost can be tested through germination index, a method to test for remaining phytotoxic substances in the compost, e.g. Ammonia gas and other forms of organic acids which occur in the incomplete decomposition. Measurement unit is percentage (%).

A.1 Equipment and materials

(1) Vegetable seeds of a germination rate of not less than 75%, e.g. lettuce, green beans, corn, radish, and etc.
(2) Distilled water
(3) A germination plate (9 cm in diameter)
(4) Filter paper No. 42 (9 cm in diameter)
(5) Compost samples.

A.2 Methodology

(1) Extracting a compost solution by mixing a compost sample with distilled water at the ratio (compost: distilled water) of 1 : 10. Shake the mixture at about 180 times per minutes for one hour before filtering it with filter paper.
(2) Draw a 10-boxes table onto the filter paper.
(3) Place a vegetable seed to each box on the filter paper, which is placed on a germination plate (10 seeds each), make at least 4 replications.
(4) Drop 3 ml. of compost solution onto each germination plates.
(5) Drop 3 ml. of distilled water onto a control plate.
(6) Keep the plates incubated in 2.4 and 2.5 in a dark room at the temperature of 28 °C to 30 °C for 48 hours.
(7) Collect the following data;
   (7.1) An average germination rate per plate (unit: %)
   (7.2) Root lengths of all germinated seeds and average them.
(8) Calculate the germination index of plant seeds by using the following formulae

Germination Index (%) =

\[
\frac{\text{% of germination in compost solution} \times \text{root length in compost solution} \times 100}{\text{% of germination in distilled water} \times \text{root length in distilled water}}
\]
ANNEX B

Analysis methods used in this Standard include the following;

B.1 AOAC refers to the latest Official Methods of Analysis of AOAC International;

AOAC 950.01 Water (Total) in Fertilizers
AOAC 967.05 Organic Matter in Peat
AOAC 973.04 pH of Peat
AOAC 955.04 Nitrogen (Total) in Fertilizers
AOAC 958.01 Phosphorus (Total) in Fertilizers
AOAC 983.02 Potassium (Total) in Fertilizers

B.2 CATM 01 A Method to Determine Particle Size Distribution of Physical Contaminants in Composted Organic Materials. (2000) by the Compost Association


ANNEX C

Symbols used in this Standard;

\( \leq \) means less than or equal to
\( \geq \) means more than or equal to
dS/m means deci-semen per metre
mm means millimetre
cm means centimetre
mg/kg means milligram per kilogram
ml means millilitre
\( ^\circ \text{C} \) means degree Celsius
\% means percentage